

PACESETTER

News From the Office of Technology Policy ■ Spring 1999



Arizona Town Hall Meeting

Deputy Secretary Robert L. Mallett travelled to Arizona to keynote the last in a series of regional IT town meetings sponsored by the Office of Technology Policy. Our host and co-sponsor was the Business and Industry Institute at Mesa Community College.

According to Commerce's own Census Bureau, Mesa, Arizona, part of Maricopa County saw higher business and employee growth than any other county between 1995 and 1996. Over 3,000 new businesses were started and the county added over 77,000 employees, so it was a good audience with which to address IT work force development.

Mallett told the 200 attendees that he came to Arizona to "talk about a critical issue facing many communities across this nation and that is the

information technology worker shortage. We know that no community can prosper without a competitive business base." Keeping a supply of educated and skilled workers in the education pipeline and partnering with industry are crucial.

Technology is critical to economic growth. Leading economists identify technical progress as a major, if not the single most important factor, in sustained economic growth, accounting for as much as one-half of our economic growth in the past 50 years... Investment in information technology now represents over 45 percent of all business equipment, far outstripping other capital investment."

Participants debated their community's priorities and needs in IT. Said

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1998 National Medal of Technology Recipients

This year's medalists include one of the world's most esteemed heart surgeons; a team of computer scientists who helped lay the foundation for the Information Age; a team of engineers who pioneered the field of biogenetic agriculture; and two innovative biomedical companies. The winners of the Medal—the nation's most prestigious award for technological innovation—were announced by President Clinton at the White House in December 1998. Praising the Medalists, the President said, "These extraordinary scientists and engineers have applied their creativity, resolve, and restless spirit of innovation to ensure continued U.S. leadership across the frontiers of scientific knowledge."



The 1998 National Medal of Technology Winners are:

■ **Denton A. Cooley** President and Surgeon-in-Chief, Texas Heart Institute

Brief Biography: Nearly thirty years ago Dr. Cooley performed the first successful human heart transplant in the United States. In 1969, he became the first surgeon in the world to implant an artificial heart in man as a bridge to heart transplantation. Back in 1962, Dr. Cooley had an idea that changed the process by which surgeons perform heart surgery. He began to use glucose rather than

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■ "What is at stake in meeting [the IT work force] demand, to be completely candid, is nothing less than the competitiveness of our country in the 21st century." – Robert L. Mallett

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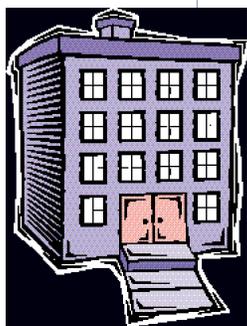
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In 1994 3 million people used the Internet. By the end of 1999, it is expected 200 million people will be surfing the Web.

one attendee. "We need an industry structure model that we can all adhere to so we can go back to K-12 and say, 'Here's the job skills that the industry requires, here's the job skills that people in the marketplace require.' We don't have that in place and until we do, I don't care what process or what initiatives we have in this country, we will not succeed."

But another member of the audience challenged this idea by noting the rapid change of technology. The skill set a student needs when starting school will not be the skill set needed by the time he or she graduates, he noted.

Following the opening plenary sessions, break out sessions brought together regional leaders to discuss key issues facing the local IT industry. The first panel included Deputy Assistant Secretary, Kelly Carnes and local CEOs. The second panel included representatives from the State Department of Commerce as well as local businesses and educational institutions.

Other conference sponsors included: Arizona Software Association, Mesa Community College, ARIZONA MESA, American Electronics Association, and Information Technology Associates of Southern Arizona. ■

A native Houstonian, Cooley graduated from the University of Texas with highest honors and received his M.D. from the John Hopkins University School of Medicine. A lifetime of achievement is reflected in over 80 honors and awards. In celebration of his 50th anniversary in medicine, his granddaughter Sarah Cooley Walker wrote: "As the oldest of your [16] grandchildren, I write for all of us [when I say] we feel your most admirable achievement is how you have maintained balance between your work and your family. Considering our number, it is no small achievement to stay involved in all our activities: attending baseball, hockey, basketball, and football games; theater performances; and confirmations; to name a few. We recognize your dedication to staying involved in our lives. Even the babies feel it when they bounce on your knees."

Citation: For his inspirational skill, leadership, and technical accomplishments during six decades of practicing cardiovascular surgery, including having performed the first successful human heart transplant in the United States and the world's first implantation of an artificial heart in man as a bridge to heart transplantation, and for founding the Texas Heart Institute, which has served more heart patients than any other institution in the world.

- **Monsanto Team**
Robert T. Fraley,
 Co-President, Agriculture Sector
- Robert B. Horsch**,
 Co-President, Sustainable
 Development Sector and General
 Manager, Agracetus Research Campus
- Ernest G. Jaworski**,
 Director (ret.), Biological Sciences
 Program

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blood to prime the heart-lung machine, which oxygenated and circulated blood throughout the body while the heart was being repaired. The process worked, and as a result, surgeons were able to conserve blood and patients who did not need transfusions were spared exposure to possible contaminants. With less demand for blood, more operations could be performed.

Denton Cooley began repairing heart defects over five decades ago. It is because of Dr. Cooley

that many of the procedures and devices commonly employed in open heart surgery are used today. His innovations have resulted in new surgical techniques to correct previously inoperable conditions. He developed new prosthetic devices and equipment that save lives and aid the practice of cardiovascular surgery.

Perhaps Cooley's most significant contribution was his founding of the Texas Heart Institute in 1962 at the Houston Texas Medical Center. As

President and Surgeon-in-Chief, Cooley and his associates have performed over 93,000 open heart operations at the Texas Heart Institute saving and extending the lives of thousands of patients. Over the past 35 years, the Institute has become the world-renowned leader in research and education for the study, prevention, and treatment of diseases of the heart and blood vessels.

Because of Cooley's leadership, the Institute is known not only for its research and quality patient care, but also for its active educational programs, which produce qualified specialists in cardiovascular medicine.

Cooley contributed to the development of techniques for repair and replacement of diseased heart valves, including designing the Cooley-Cutter valve. He also designed or developed approximately 200 surgical products, and disposable surgical supplies. Cooley is widely known for operations to correct congenital heart anomalies in infants and children, saving the lives of thousands of children.



■ Denton A. Cooley, M.D.

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Stephen G. Rogers,

Director, Biotechnology Projects,
Europe, Monsanto European Center
for Crop Research

Brief Biography: This team has changed the face of agriculture by engineering superior plants resistant to pests, weeds, disease and herbicides that help farmers increase crop yield.

Since World War II, and until recently, the U.S. has relied heavily on chemistry to address agriculture's problems, and most research and development programs have focused on discovering and developing the next blockbuster herbicide, insecticide, or fungicide. But at Monsanto, Ernest Jaworski has been studying the advances being made in molecular biology and exploring how this science could be applied to agriculture. In 1980, Jaworski recruited Stephen Rogers, Robert Fraley, and Robert Horsch, and charged them with the mission of establishing a library of state-of-the-art technologies for the genetic engineering of plants and developing fundamental knowledge that would lead to new business opportunities in agriculture.

Within two years, the team successfully developed a method for genetically engineering a plant cell with a newly introduced gene. This achievement was followed rapidly by the invention of methods to regenerate whole plants that passed the engineered gene through seeds to future generations of the crop. By 1987, a set of historic field tests were conducted on plants with tolerance to insects, virus, or Roundup® herbicide.

Today, agricultural biotechnology is one of the cornerstones of the newly reorganized Monsanto Company. More than 1,000 high-skill and high-paying jobs support the rapidly growing number and volume of new

products of biotechnology. This part of Monsanto's business has grown from utilizing about 4 million acres in 1996, to over 43 million acres in 1998. Monsanto has launched nine major commercial products in the past two years, helping growers to increase crop yields and farm income by providing superior protection against insects and weeds.

Outside Monsanto, the team's commitment to sharing its knowledge with academic institutions and government laboratories has significantly advanced the science of plant biology and the industry of plant biotechnology. The team's methods in gene expression and gene transfer technology are the dominant methods used in the field today. Overall, the team's pioneering achievements are enhancing the sustainability of U.S. agriculture while providing products with superior performance and economical and environmental benefits to growers, food processors and consumers.

Robert Fraley, who holds a Ph.D. in microbiology and biochemistry from the University of Illinois, grew up on a farm in central Illinois. He helped pay college expenses by working at a factory making cans. Currently, Fraley is Co-President of the Agriculture Sector of Monsanto.

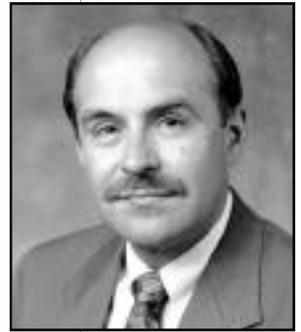
Robert Horsch earned his Ph.D. in genetics from the University of California, Riverside, where he helped to support his family during graduate school by making and selling pottery. He now spends much of his time restoring native prairie plants, backpacking, biking, and cross country skiing. Horsch is Co-President, Sustainable Development Sector and General Manager for the Agracetus Research Campus of Monsanto.

Ernest Jaworski received his Ph.D. in biochemistry from Oregon State University, where his unusual skills as a glass blower saved his agricultural chemistry department money by allowing them to reuse the specialized glass flasks and other laboratory equipment he repaired. Jaworski is an avid skier and an accomplished sailor. Presently retired, he is the founding director of the Biological Sciences Program at Monsanto.

Stephen Rogers received his Ph.D. in biology from Johns Hopkins University, and he is currently the Director for Monsanto's Biotechnology Projects, Europe and the head of its European Center for Crop Research. He likes to cook various ethnic cuisines, hike, do magic tricks, and travel. During the last few years, work and recreation have taken Rogers to Iceland, Thailand, China, Israel, and most of the European countries.

In addition to their many individual honors and achievements, the members of the team were jointly honored as recipients of Monsanto's Thomas & Hochwalt Award.

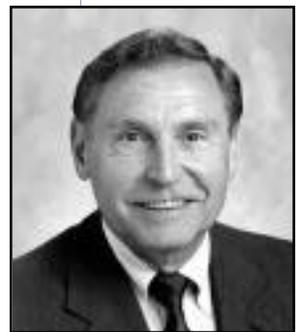
Citation: For pioneering achievements in plant biology and agricultural biotechnology and for global leadership in the development and commercialization of genetically modified crops to enhance agricultural productivity and sustainability.



■ Robert T. Fraley



■ Robert B. Horsch



■ Ernest G. Jaworski



■ Stephen G. Rogers

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Medal Winners from page 3

■ **Lucent Technologies,
Bell Laboratories Team**

Kenneth L. Thompson,
Distinguished Member, Technical
Staff and Bell Labs Fellow

Dennis M. Ritchie,
Head, Systems Software Research
Department

Brief Biography: It would be hard to claim that any one person or team ushered in the Information Age. But it would be easy to question whether this country would have obtained the world leadership we now enjoy had it not been for the enormous contributions from the two winners from Lucent Technologies, Bell Labs.

The astounding progress of computer hardware, software, and networks during the past quarter century has provided the basis of the Information Age, benefiting hundreds of millions of people around the world and propelling the United States into an undisputed leadership position. Much of this progress can be traced to two fundamental innovations--the Unix operating system and the C programming language--both created by Kenneth L. Thompson and Dennis M. Ritchie of Lucent Technologies' Bell Laboratories, pioneers of computer science, engineering and technology.

Before Unix, operating systems were large, vendor-specific, and designed to cope with particular features of a given machine. Unix was the first portable operating system, usable almost without change across the span of hardware from the smallest laptops to super-computers. More importantly, Unix

embodied visionary ideas--deliberate generality and openness--that today are fundamental to the explosive growth of information technology.

The successes of Unix are intertwined with C, the first general-purpose programming language to combine the efficiency of assembly language with high-level abstract expressiveness. Like Unix, C programs can move essentially without change from machine to machine, removing the need for expensive, error-prone software rewrites. Thus C remains the bedrock upon which most system-level software is built, and its influence continues to spread through its descendants C++ and Java.

The pervasiveness and impact of Unix and C cannot be overstated. Unix is the operating system of most large Internet servers, businesses, and universities. Most commercial software is written in C, C++, or Java. A major part of academic and industrial research in operating systems is based on Unix. The principles underlying Unix and C consistently have inspired applications and extensions undreamed of in the early days of computing.

Although the two inventors' contributions are visible in every aspect of Unix and C, it was Thompson who first set out to build a better computing environment, and Ritchie who initiated the design of a better programming language. The two worked together on the design and implementation of Unix for several years, and C grew out of an earlier language, B, which was written by Thompson. In essence, Ritchie and Thompson worked so closely together during the development of C and Unix that it is not possible to separate their individual contributions cleanly. It was precisely their combined talents that made their remarkable achievements possible.

Kenneth Thompson received an M.S. in electrical engineering from the University of California, Berkeley. He is a Distinguished Member of the Technical Staff in the Computing Sciences Research Center at Bell Laboratories, Lucent Technologies. **Dennis Ritchie** completed a Ph.D. thesis in applied mathematics at Harvard University. He is the head of Systems Software Research Department at Bell Laboratories, Lucent Technologies.

Both Ritchie and Thompson are members of the National Academy of Engineering, and both are Bell Labs Fellows. Ritchie is an avid reader of scientific biographies and of humorous works, and he values dearly the time he spends at a summer retreat in Pennsylvania with his extended family. Thompson pilots planes and instructs students in how to do the same. In addition to numerous individual honors, the two were jointly awarded the IEEE Richard E. Hamming Medal, the ACM Turing Award, and the IEEE Emmanuel Piore Award.

Citation: For co-inventing the Unix™ operating system and the C programming language, which together have led to enormous advances in computer hardware, software, and networking systems, and have stimulated the growth of an entire industry, thereby enhancing American leadership in the Information Age.

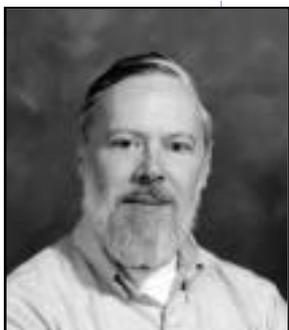
■ **Biogen, Inc.**

Brief Biography: If you suffer from multiple sclerosis, leukemia, or hepatitis B, Biogen may be well known to you. Biogen is a leading biotechnology company, whose innovative biopharmaceuticals are enhancing the lives of people who suffer from a variety of diseases.

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■ Kenneth L. Thompson



■ Dennis M. Ritchie



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Founded in 1978, Biogen, Inc., based in Cambridge, Massachusetts, is one of the leading companies in the vibrant new industry of biotechnology and biopharmaceuticals. The company got its start when a group of internationally acclaimed scientists, including two future Nobel laureates, pooled their talent and resources. Today it is the world's second-largest independent biotechnology company in terms of market capitalization, and it is one of a handful of companies in its industry that successfully has commercialized their own drugs while remaining independent. Three major products are on the global market today as a direct result of Biogen's efforts, and each serves a large, previously under-treated market. They are:

AVONEX® (Interferon beta-1a):

Licensed by the U.S. Food and Drug Administration (FDA) in 1996, AVONEX® is the first drug that slows both the progression of disability and the frequency of exacerbations in people with relapsing forms of multiple sclerosis (M.S.). M.S. is a progressive, debilitating disease of the nervous system, and while there is yet no cure, AVONEX® offers patients the potential to significantly resist its most disabling effects.

Intron® A alpha interferon is marketed by Biogen's licensee Schering-Plough Corporation and ranks 55th among the top 100 prescription drugs by worldwide sales. Approved in 1986 for the relatively minor disease indication of hairy cell leukemia, Intron® A is now marketed in more than 80 countries for treatment of 16 major disease indications. Schering-Plough is continuing its active development program for this drug with several clinical trials currently underway. Intron® A is used to treat hepatitis B and C, potentially life-threatening diseases that affect millions of people

throughout the world. It also is an important treatment for AIDS-related Kaposi's sarcoma and several other cancers.

Hepatitis B vaccines are the first vaccines developed using recombinant DNA technology and the first successful preventives for one of the world's most common and life-threatening diseases. In 1995, hepatitis B vaccine sales exceeded \$1 billion annually, the first time a vaccine has exceeded this important pharmaceutical industry milestone.

Biogen has a number of important on-going research programs, particularly in the areas of inflammatory disease, heart disease, kidney disease, gene therapy and developmental biology. It is from these promising new compounds that the second and third generation of Biogen products are expected to hit the market.

In addition to its research efforts, Biogen has donated money to non-profit health and community-service groups serving the Cambridge/Boston area and laboratory equipment and supplies to local universities and community colleges. Looking to the future, Biogen has been a leader in the Boston Science Careers Project, a new program designed to attract qualified minority students into biomedical careers.

Citation: For leadership in applying breakthroughs in biology to the development of life-saving and life-enhancing pharmaceutical products designed to treat large, previously underserved patient populations throughout the world, including development of hepatitis B vaccines, the first vaccines using recombinant DNA technology.

■ **Bristol-Myers Squibb Company**

Brief Biography: Founded 110-years ago, the Bristol-Myers Squibb Company today is a diversified health

and personal care company with 55,000 employees worldwide (including 25,000 in the U.S.) and \$16.7 billion in annual sales. It produces some of the world's leading drug therapies to control cardiovascular diseases and to fight cancer. Bristol-Myers Squibb is a leader in treatments for infectious disease, including AIDS/HIV and central nervous system and dermatologic disorders.



■ James L. Vincent
Chairman, Biogen, Inc.

Spearheading the discovery and development effort at Bristol-Myers Squibb is the Pharmaceutical Research Institute (PRI). Headquartered in Princeton, N.J., PRI has eight major sites in the U.S. and Europe linked to a network of smaller facilities and research partners worldwide. This collective investment of talent and resources is focused on a growing portfolio of eleven therapeutic areas: cardiovascular and metabolic disease, oncology, neurosciences, dermatology, immunology and inflammation, anti-infectives (including antibiotics, anti-fungals and antivirals), urology, pain management, and pulmonary disease. Currently there are about 50 drugs in development in the PRI pipeline.

In all, Bristol-Myers Squibb invests about \$1.3 billion annually in pharmaceutical research. Results include more than 15, 400 U.S. and foreign patents current or pending, and--since 1990--an average of nearly 1,000 patents each year granted to company scientists.

An example of the Bristol-Myers Squibb's success, is the story of the development and marketing of the cardiovascular drug Capoten. In 1975, Capoten became the first drug discovered through "rational drug design." Previously, drug discovery

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was serendipitous; it was done more or less through random screening of compounds in a tedious search for drugs with disease-fighting potential.

The discovery of Capoten, however, was the result of a novel approach. It was deliberately designed by scientists to target an enzyme responsible for controlling blood pressure. Now targeted drug development, or “rational drug design,” is widely employed by industry, biotechnology, and academic scientists.

To demonstrate Capoten’s therapeutic benefits, Bristol-Myers Squibb undertook a series of clinical trials involving thousands of patients over a 15 year period. In the process, the company rewrote the clinical textbooks on the optimal treatment of patients with cardiovascular disease—a science that had been in its infancy. In 1983, Capoten became the first drug in over a generation to be approved for use in all stages of heart failure, and in 1994 it won FDA approval as the first medication found to reduce the near-term risk of death and to slow the progress of serious kidney disease in insulin-dependent diabetes patients.

Bristol-Myers Squibb analyzed the results of 28,000 patients enrolled in research programs sponsored by the company, and used these extensive clinical studies as models for the industry. They were crucial to proving the benefits of lowering cholesterol in extending and enhancing the lives of patients at-risk.

As a result of Capoten, Pravachol, and other drug discoveries, Bristol-Myers Squibb has redefined the science of the clinical study—conducting and sponsoring hugely complex

trials that have involved years of work, thousands of patients, and millions of dollars. These innovative clinical trials have helped to advance the public’s knowledge and understanding of complex diseases. Some of these studies (many published in *The New England Journal of Medicine* and known by abbreviated titles like SAVE, CARE, and Quality of Life) not only have become industry models but have changed the practice of medicine.

Bristol-Myers Squibb and its employees are the recipients of numerous awards and honors for significant achievement in science, business, and education.

Citation: For extending and enhancing human life through innovative pharmaceutical research and development, and for redefining the science of clinical study through groundbreaking and hugely complex clinical trials that are recognized models in the industry. ■



■ Charles A. Heimbold, Jr.,
Chairman and CEO,
Bristol-Myers Squibb Company

EPSCoT Winners Announced

The Technology Administration has awarded \$1.6 million in matching funds to seven organizations, including universities, state government agencies and small business development centers, under the Experimental Program to Stimulate Competitive Technology (*EPSCoT*).

EPSCoT is an innovative program that supports the efforts of rural states to promote technology-based economic growth. **The first EPSCoT award winners are:**

- Alabama Department of Economic and Community Affairs for developing and implementing technology-based economic development in Alabama.
- Dakota State University for EPSCoT West, a four-state (SD, ND, MT and WY) technology business network.
- Eastern Maine Development Corporation for the Maine Technology Commercialization Network.
- Louisiana Board of Regents for accelerating commercialization of university-based technologies in Louisiana.
- University of Mississippi for the Mississippi SBIR/STTR Project.
- University of Puerto Rico for improving small businesses’ access to technological expertise.
- Boise State University for the Idaho technology business network.

The funded projects will identify and eliminate barriers to technology transfer, enhance competitiveness for Federal R&D programs and improve small business’ access to technological expertise. A group of states is collaborating to knit together a regional network of business services that will accomplish on a regional basis what is not possible in each state individually.

Developed by the Department of Commerce in partnership with the states, *EPSCoT* is a competitive matching grants program that reaches beyond traditional constituencies to assist rural states to participate fully in the New Economy. Throughout its first year, *EPSCoT* has met with overwhelming enthusiasm. Eighteen of the nineteen eligible states participated, submitting 25 applications that requested over \$9.4 million – almost six times as much as was appropriated. ■

Acting Under Secretary Bachula Co-hosts State Federal Dialogue on the 21st Century Economy with the Science and Technology Council of the States

The **United States Innovation Partnership** (USIP) agreed to co-host with the Science and Technology Council of the States (STCS) a series of roundtable discussions that address the issue of technology-based economic development from the vantage point of the states. The first of these meetings with state science and technology stakeholders was held in Washington, D.C., and featured five states with strong commitments in this area of technology-based economic development. The meeting was chaired jointly by Gary R. Bachula, Acting Under Secretary for Technology at the U.S. Department of Commerce and Delbert J. Schuh II, Chairman, Science and Technology Council of the States.

USIP is a state-federal partnership, created in June 1997 to establish a new working relationship between the states and the federal government which will promote the development of a national innovation system.

The Role of States in Science and Technology

States play an important role in supporting science and technology in the U.S. In FY 1995, states spent approximately \$3 billion on research and development and about \$500 million on technology-based economic development programs. Many, if not most, state technology-based economic development programs were developed in response to changes in the state's economy. These programs originated during times of economic transition, often in a period of crisis.

Common characteristics of state programs include the willingness to take risks, the involvement of higher education, a focus on new start-up companies, and emphasis on downstream

activities; i.e. product development and commercialization rather than basic research. In addition, state programs are market-driven with strong private sector participation.

Today, it is common for states to support intermediary organizations at the regional or local level to actually deliver services. The ingredients of a successful technology-based economic development program include the involvement and support of a strong research university, networking among firms and organizations, outside discretionary funding, indigenous venture capital, and a long-term perspective.

State Best Practices

The following states were represented at the roundtable meeting and each had unique best practices to share with all of the roundtable participants:

Oklahoma

Howard Barnett, Secretary of Commerce, State of Oklahoma.

Dr. Carolyn Sales, Director, Oklahoma Center for the Advancement of Science and Technology (OCAST)

Created in 1987, OCAST's mission is to foster innovation in existing and developing businesses by supporting basic and applied research, facilitating technology transfer between research laboratories and firms and farms, and providing seed-capital for new innovative firms and their products. OCAST spearheads the University/Industry Technology Transfer Initiative (1998) which established, via the Technology Transfer Act, university technology transfer offices and the Technology Commercialization Center. Constitutional amendments were passed, November 1998,

which permit colleges and universities to own technology by hosting businesses on their property for the purposes of project development. For more information on OCAST contact the website: <http://www.ocast.state.ok.us>.

Kansas

Lieutenant Governor Gary Sherrer, Secretary, Kansas Department of Housing

Rich Bendis, President of the Kansas Technology Enterprise Corporation (KTEC)



■ *Joseph Bordogna*, NSF, Lieutenant Governor *Gary Sherrer*, Kansas and *Rich Bendis*, KTEC.

KTEC, was established in 1987 to stimulate economic development in the State of Kansas, and is responsible for the State Small Business Innovation Research program (SSBIR). One of four programs which helps small companies compete for federal SBIR awards, SSBIR is a partnership between federal and state governments and private industry which is designed to accelerate commercialization of new technologies. Under SSBIR, additional funds and support are available to selected small businesses over and above SBIR funding.

For more information on KTEC contact the website: <http://www.ktec.com>. For information on SSBIR contact: <http://www.informationresearch.com>.

Indiana

Mike Gery, Executive Assistant, Legislative Affairs, Office of the Governor, State of Indiana

"Networking and competitive alliances are critical to the success of technology in economic development. State and the Federal Government must join together to face the challenges of the 21st century economy."

Delbert J. Schuh II

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Delbert J. Schuh II, President, Indiana Business Modernization and Technology Corporation (BMT)

Established in 1983, BMT is a non-profit organization offering business assistance ser-



■ Del Schuh, BMT and Mike Gery, Office of the Governor, State of Indiana.

"As the country transitions to the New Economy, we must explore how federal agencies can effectively partner with states to ensure that the benefits will accrue to all peoples and regions of the nation."

Gary R. Bachula

vices and resources to small- and medium-sized Indiana companies to aid expansion while creating and retaining

high value jobs. Statewide BMT initiatives are in place, each with their own appointed managers and led by a task force of industry leaders, associations and academics, with responsibility for plastics, medical device, machine tool users, electronics, printing and the automotive industries to help identify common challenges faced by Indiana companies.

For more information on BMT contact the website: <http://www.bmtadvantage.com>.

Utah

David Winder, Executive Director, Utah Department of Community and Economic Development.

Rod Linton, Director, Office of Technology Development, Utah Department of Community and Economic Development

The Office of Technology Development and the Centers of Excellence Program were created in 1986. The Utah Centers of Excellence Program is a state funded grant program which supports selected research programs at Utah's universities. Programs are selected based on leading edge research activities that have projected commercial value. The primary objective is to encourage the commercializa-

tion of leading edge technologies through licensing patented technologies and by creating new companies. (126 have already been established.)

For more information on Utah's Office of Technology Development contact the website: <http://www.dced.state.ut.us>

Pennsylvania

Terri Kaufman, Director, Office of Science and Technology, Department of Community and Economic Development

Inaugurated in the summer of 1996, Technology 21 seeks industry input as to what is needed from state government for high-tech firms to succeed in today's environment. Organized around broadly defined industry clusters (including Advanced Manufacturing, Biotechnology and Information Technology) members have made recommendations regarding marketing, Technology Communities and emerging technology partnerships. To highlight Pennsylvania's technology accomplishments, Governor Ridge inaugurated the "21 Days of Technology" in January 1998, during which daily announcements of technology initiatives and events statewide were made, including the unveiling of the 1998-99 budget plan, allocating \$22.9M for state government-wide technology projects.

For more information on Technology 21 contact the website: <http://www.dced.state.pa.us>

Also in attendance were the following representatives of federal agencies and organizations:

Duncan T. Moore, Associate Director for Technology, White House Office of Science and Technology Policy; Dr. Joseph Bordogna, Acting Deputy Director,



■ Gary Bachula, Acting Under Secretary for Technology describes the 21st Century Economy.

National Science Foundation; Phillip A. Singerman, Assistant Secretary, Economic Development Administration, U.S. Department of Commerce; Daniel O. Hill, Assistant Administrator, Office of Technology, Small Business Administration; Fenton Carey, Associate Administrator for Research, Technology Analysis, U.S. Dept. of Transportation, Ray Kammer, Director, National Institute of Standards and Technology; Kelly Carnes, Deputy Assistant Secretary for Technology Policy, U.S. Dept. of Commerce; Pat Flaherty, Secretariat, United States Innovation Partnership, U.S. Dept. of Commerce.

Thom Rubel, Director, Economic Development and Commerce Policy Studies Division, represented the National Governors' Association. The American Society of Mechanical Engineers and the State Science and Technology Institute also participated as sponsors of the event. ■

Gila River Indian Community

While in Arizona, Deputy Secretary Robert Mallett toured the Gila River Indian Community with Tribal Governor Mary Thomas and Lt. Governor Cecil F. Antone as his hosts.



■ Robert Mallett accepts a present—a calendar made by Gila students.

The Indian reservation is home to six different Indian tribes who formed a community that Governor Thomas says is home to a solid economic development program that will support self-determination through the application of tribal sovereignty. A unique initiative being undertaken by the community in partnership with Intel Corporation includes six Technology Education Centers.

The centers allow the tribes to enhance the math and science education of Indian students and access the Internet using 37 120-MHz



■ Deputy Secretary Robert Mallett and Tribal Governor Mary Thomas tour the Gila River computer lab, a partnership with Intel. American Indians make up less than one percent of America's science and engineering labor force overall.

Pentium processor-based computers, 10 laptops, six routers and networking equipment including a T1 line. The centers are made possible through a combination of federal, Tribal, and Intel money.

The initiative has other components including a college success program, school-to-work internships, teacher training and a community-based education model that uses real issues to teach basics in math and science.

Intel's involvement began in 1994 when Dr. Craig Barrett, Intel's chief operation officer, was asked to deliver the keynote address at the

national conference of the American Indian Science and Engineering Society (AISES). As a result of his keynote, Intel, along with Native American representatives, formed a task force to propose a wide-ranging initiative that would simultaneously provide innovative ways to address the educational needs of Native Americans and the business needs of Intel. Some of the issues include: the alarming dropout rate among Native American students, the need to develop a larger work force of technically trained Native Americans, and Intel's commitment to having a work force that mirrors its local communities. The task force led to the development of a partnership that included Intel, Gila River Indian Community (GRIC), Santa Fe Indian School (SFIS) and American Indian Science and Engineering Society (AISES). ■

"The bottom line, we need to do two things: one, inspire young Americans to technology careers and two, retrain existing workers in information technology. We simply must encourage our children to dream as much about being a software engineer as a basketball player."

Robert L. Mallett

Gila Presentation

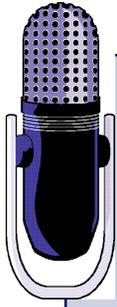
During his trip to Arizona, Deputy Secretary Robert Mallett visited the Gila River Indian Community (GRIC) and heard from Leslie Cozette Stovall who stated that IT training has allowed her to use state-of-the-art technology to map physical and cultural aspects of the community.

The Survey and Cartography Section of the Gila River Indian Community-Cultural Resource Management Program (GRIC-CRMP) was established in 1996 with the primary goal to assist the field mapping and documentation of archaeological sites and other cultural resources. The section has also been charged with the responsibility to develop and expand its Geographic Information System (GIS) capabilities, incorporating the accumulating cultural resource database with other relevant data, such as vegetation zones, soil classes, land-use areas, canals, roads, and allotment ownership.

The Cultural Resource Management Program has established a Survey and Cartography Section, to gather information such as archaeological site boundaries. Work is also progressing to map canals, roads, power lines, and other features using the Total Station and GPS (Global Positioning System). This equipment gives the position of any feature on the face of the earth within a centimeter of its true location. ■



■ Deputy Secretary Robert Mallett listens to tribal leaders and students at a round-table discussion.



Something to Talk About! In the Next PACESETTER

- Announcement from the Sixth Bi-annual Meeting of the U.S.-Israel Science & Technology Commission

- OTP releases its IT report after a year of regional town meetings. Innovative practices from Mississippi to Seattle and suggested next steps in IT work force development.

- An Update on Commercial Space
- The success of the GO4IT web site

- Pictured on cover is the Yale University bell tower. OTP recently joined Yale's School of Forestry and Environmental Management to roll out OTP's report on the environmental industry.

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